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ABSTRACT

This curriculum guide is intended for any librarian in Pennsylvania committed to teaching online searching and looking for guidelines to integrate the skill into the full academic curriculum. The publication will enable school librarians to assist students in developing the skills that will enable them to search and retrieve information from computerized databases, not only to access information necessary for their studies, but also to acquire skills for lifelong learning. (Only bibliographic databases are covered in this document.) It is recommended that this curriculum be integrated with the teaching of library media skills in other curriculum areas. The librarian and various subject area teachers should jointly establish the goals and objectives for the implementation of the online curriculum. The first section of this guide, "Online Curriculum," includes the following subsections: an introduction, offline suggestions, course objectives and student outcomes, planned course scope and sequence, and sample lesson plans. The second section, "Online Management," includes: an introduction, budget and costs, vendors, gateway software, telecommunications, copyright, security, recordkeeping, and cooperation and support. References, an annotated bibliography and numerous appendices, including a sample search and lists of vendors, telecommunications networks, and commonly used databases, are provided. (THC)

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# PENNSYLVANIA ONLINE:

## A Curriculum Guide for School Library Media Centers

ACCESS PENNSYLVANIA

An Agenda for Knowledge and Information Through Libraries

State Library of Pennsylvania

IR051397



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Elliot L. Shelkrot, State Librarian

Division of School Library Media Services
Doris M. Epler, Director

October, 1985

Pennsylvania Department of Education
Bureau of State Library
Division of School Library Media Services
333 Market Street
Harrisburg, PA 17126-0333

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## INTRODUCTION

In September 1984, Governor Dick Thornburgh announced ACCESS Pennsylvania: An Agenda for Knowledge and Information Through Libraries. This program recognizes the need to make Pennsylvania's vast library and information resources available to all residents. The Governor included school libraries in his agenda, saying that:

> "Because the role of the librarian as a teacher of information searching skills is more important now than ever before, it is recommended that the State Library develop guidelines to fully integrate the online search skills into the school library media program and increase the effort to train librarians to teach students in this area."

The National Commission on Libraries and Information Science (NCLIS) submitted its 13th annual report to President Reagan on April 30, 1985. NCLIS provides advice and assistance to both the executive and legislative branches on national library and information-related policies and plans. The 1985 NCLIS report states:

> "Currently libraries are faced with a reduction in available resources as well as the opportunity to play a leading role in helping to improve national productivity. Some of the ways in which libraries and informational professionals can help are by teaching information skills, providing valuable information resources and managing them effectively and harnessing the new information technologies." (p. 33)

The number one recommendation that NCLIS made on information and productivity and the implications for education and training is as follows:

> "A completely new approach to the school curriculum be adopted whereby children, in addition to teaching computer skills from an early age, learn to use libraries and learn how to find and use information effectively. This skill is seen as the 'fourth R' and is essential in the learning process from cradle to grave." (p. 34)

Librarians have traditionally taught students how to find information by looking in card catalogs and using indexes such as the Reader's Guide. However, Pennsylvania students must be taught skills that will enable them to search and retrieve information from computerized databases, not only to access information necessary for their studies, but to acquire skills for lifelong learning. Therefore, we are pleased to provide you with a copy of PENNSYLVANIA ONLINE, which is the result of the work accomplished by a committee of practicing school librarians and library teacher educators listed on the acknowledgement page of this document.

This curriculum guide is intended for the novice, the librarian with some knowledge and the librarian who is already committed to teaching online searching and looking for guidelines to develop a full curriculum. Even those librarians who have not yet made a decision regarding the implementation of online searching in their schools will find sample lesson plans that will enable them to create an awareness in students that computerized databases exist in area facilities.

PENNSYLVANIA ONLINE: A Curriculum Guide for School Library Media Centers will enable school librarians to assist Pennsylvania students in entering the world of online information retrieval.

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Dr. Margaret Tassia
Chair
Library Science Department
Millersville University
Millersville, PA 17551

Betty C. Cherry
Librarian
McCaskey High School
Lancaster, PA 17602

Elyse Evans Fiebert
Head Librarian
Radnor High School
Radnor, PA 19087

Dreama K. Deskins
Project Supervisor
PALINET
Philadelphia, PA 19104

Phyllis R. Martin
Librarian
Shikellamy High School
Sunbury, PA 17801

Rita Rosen
Librarian
George Washington High School
Philadelphia, PA 19116

Trish Rovner
Librarian
Manheim Central High School
Manheim, PA 17545

Dr. Jacqueline C. Mancall
Drexel University
College of Information Studies
Philadelphia, PA 19104

Joseph A. Marrone
Librarian
St. Marys Area Middle School
St. Marys, PA 15857

Peggy Benjamin
Librarian
North Pocono High School
Moscow, PA 18444

Doris Merriam
Assistant Professor
Millersville University
Millersville, PA 17551

Mary McMahon
BRS Information Technologies
Bryn Mawr, PA 19010

Kevin Karrs
Librarian/Media Coordinator
Clearfield High School
Clearfield, PA 16830

Marilyn Shontz
Chair
Library Science Department
Shippensburg University
Shippensburg, PA 17257

Elizabeth A. Owen
Librarian
Cumberland Valley High School
Mechanicsburg, PA 17055

PDE Staff

Doris M. Epler
Director
Division of School Library
Media Services
Bureau of State Library

Neil Richvalsky
School Library Advisor
Division of School Library
Media Services
Bureau of State Library

Susan E. Barron
Educational Resource Specialist
Division of School Library
Media Services
Bureau of State Library

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# SECTION I- Online Curriculum

## INTRODUCTION

Online bibliographic searching, as addressed in this curriculum guide, refers to the process of locating citations to materials by means of a computer. This process enables students and staff to gain access to a broader, more current range of materials than is available in non-computerized library sources. Only bibliographic databases are covered in this document, other types of databases, such as numeric and full-text, are not included.

This curriculum guide is intended to meet the needs of all librarians - those who are just entering the field as well as those with varying degrees of experience in online searching.

It is recommended that this curriculum be integrated with the teaching of library media skills in other curriculum areas. The librarian and various subject area teachers should jointly establish the goals and objectives for the implementation of the online curriculum. Adaptations and changes to the scope and sequence of skills can be made based on local school goals and objectives.

## OFFLINE SUGGESTIONS

The online curriculum, as it is presented in this guide, requires access to an online database with appropriate equipment. If a school does not yet have access to an online source, adaptations to the curriculum must be made. Changes may be needed for: (1) those for school libraries which have neither equipment nor online access, and (2) those for school libraries which have a microcomputer with disk drive and printer.

For school libraries with no access to a terminal or online database, the following levels of achievement cannot be obtained as stated.

Section One
- 5.2 Student will observe an online demonstration

Section Three
- 2.2 Student will logon and logoff
- 6.1 Student will execute an online search
- 7.3 Student will respond interactively with the computer while online

Should the librarian still wish to carry out these objectives as closely as possible to the original intent, it is suggested that she/he request sample searches from a source such as a vendor. It may also be possible to obtain samples of searches or logon/logoff procedures from local public or academic libraries. Samples of documentation for the various databases and vendors should also be requested. These samples can then be used in place of the actual student search for classroom instruction. Other locally produced materials such as transparencies, posters, handouts and displays, can be utilized.

It is possible for a librarian to introduce students to the world of information and online sources without implementing the full curriculum. The following objectives are suggested for inclusion:

Section One
1. Explain the role of information in our society.
4. Conduct a manual search.

Section Two
1. Recognize major concepts in problem statements.
2. Use available printed guides and aids to databases.
4. Choose appropriate key words, synonyms and variations for entry.
5. Use logical operators.
6. Choose appropriate search strategy.

Section Three
4. Identify and explain the elements of a sample search.

Section Four
2. Read and evaluate the printout for relevant citations.
4. Retrieve relevant documents.

Librarians may wish to teach online searching offline with a microcomputer. Several suggestions are offered.

1. Create a small database using a commercial database program such as "PFS File," DB Master," DataPerfect," dBaseII."

   A small database can be built by the students. As the database is constructed, the students will gain insight in database structure. When searching their database, the students will develop an awareness of the relationship of each element of a record to the database. Even if the database program that is being used does not have the capability to utilize Boolean logic, the student will begin to understand the value to Boolean logic and positional operators. The sample database could be bibliographic and each record could consist of seven fields: author's first name, last name, title of article, date, magazine, and two subject headings. Such a database will permit the librarian to teach many of the concepts of online searching.

2. Use small commercially available single disc databases such as ERIC's Microsearch.

   These discs contain a small database program and data. For example: ERIC Microsearch has many of the search capabilities of its much larger big brother. The only difference is that the smaller program does not operate as its big brother because of its limited size. Even though the protocol is not the same, this program can introduce the student to Boolean logic and other features of ERIC. BRS is expected to release a simulation of their system in the near future. At the present time, Microsearch is only available for Apple Computers but it is anticipated that it will also be available for IBM Microcomputers by January 1986.

NOTE: Some commercial database vendors market the software for mini and mainframe computers. Their programs are usually very expensive.

3. Use a word processing program to demonstrate searching.

Most word processing programs have a global search command. This command searches through the document in the computer's memory for a particular set of characters such as a word or a phrase. The class could construct several articles on the word processor. These articles could be a part of a newspaper project. All the articles must be part of the same file. The students could then search for a particular word or phrase utilizing the global search command. Many word processors also have the capability to truncate. Not only will this exercise demonstrate how electronically composed text can be easily searched, but it will also illustrate noise and false dumps, especially if truncation is being used.

4. Access a Simulated Database.

The University of Pittsburgh has a simulated database which they use when conducting online training programs. It is anticipated that arrangements could be made to access this database via telephone lines.

## COURSE OBJECTIVES AND STUDENT OUTCOMES

The online curriculum is divided into four sections:

SECTION ONE: Information in Our Society
SECTION TWO: Developing a Search Strategy
SECTION THREE: Conducting a Search
SECTION FOUR: Recordkeeping and Evaluation

The scope and sequence of skills includes 27 student competencies and 41 student outcomes. These can be expanded or contracted depending upon the target audience The total number of hours devoted to each section will vary according to the needs, resources, and instructional goals of the local school district.

All of the course objectives and student outcomes have been listed by section. This list may prove to be helpful when developing skill charts or recordkeeping books.

The scope and sequence charts provide a great deal of information which will be helpful in planning instruction. This includes the following:

.. The quality goals of education to which the skill is linked are identified by number. Please refer to Appendix H for the complete list of goals and objectives.

.. The course objective is identified and the level of instruction is indicated. "I" is used for a skill which is introduced, "R" is used for a skill which is being reviewed or re-taught, "M" is used for mastery and "E" for enrich or expand. Some lesson plans have also been developed for the course objectives. When a plan is available for a specific objective, it is indicated immediately below the objective. All sample lesson plans are directly behind the scope and sequence chart.

.. The content of the lesson is summarized and appropriate resources and materials are identified. These are not all inclusive and can easily be expanded upon.

.. The expected levels of achievement are the student outcomes. These are the items which should be evaluated to determine if achievement has been demonstrated by the student.

.. The procedures for evaluation present recommended ways in which testing can occur. The grading process, however, is a local decision and should be handled accordingly.

This curriculum could be used to meet some of the requirements in Chapter 5, Section 5.7. While it is recommended that the curriculum be integrated with other discipline areas, the librarian can play a vital role in its delivery.

SECTION ONE: Information in our Society

1. Explain the role of information in our society.

   * The student will participate in a class discussion on the impact of information in our society.

   * The student will gather information about the use of information in our society.

2. Select and refine a topic.

   * The student will state a topic within the context of the assignment in at least one but no more than three sentences.

3. Produce a working annotated bibliography.

   * The student will produce a working annotated bibliography of print and nonprint resources.

4. Conduct a manual search.

   * The student will complete a manual search.

5. Develop an awareness of online searching as an information tool.

   * The student will define terminology associated with online bibliographic searching.

   * The student will observe an online demonstration.

SECTION TWO: Developing a Search Strategy

1. Recognize major concepts in problem statements.

   * The student will identify major concepts in a problem statement.

2. Use available printed guides and aids to databases.

   * The student will select databases most appropriate for an individual search.

3. Use printed guides to specific databases.

   * The student will extract and apply key points from the printed vendor documentation, e.g., aid page for successful searching.

4. Choose appropriate key words, synonyms and variations for entry.

   * The student will compile a list of searchable terms using, where appropriate, truncations, variant spellings and proper names.

5. Use logical operators.

   * The student will combine search terms using appropriate logical operators to define and limit a topic.

6. Choose appropriate search strategy.

   * The student will distinguish between free text vs. controlled vocabulary searching.

7. Use basic system protocol (features).

   * The student will prepare a basic written outline for a search using system protocol.

8. Use advanced system protocol.

   * The student will prepare a search strategy using advanced system protocol.

SECTION THREE: Conducting a Search

1. Develop an awareness of the telecommunications process.

   * The student will discuss the various components of telecommunications.

2. Develop a step by step procedure for logging on and off.

   * The student will write a step by step procedure for logging on and off.

   * The student will logon and logoff.

   * The student will demonstrate an awareness of the importance of system security.

3. Locate, identify and use special function keys to break and correct errors.

   * The student will demonstrate competency in the use of special function keys.

4. Identify and explain the elements of a sample search.

   * The student will identify and explain the components of a sample search.

5. Develop a search strategy for using online databases.

   * The student will write an effective strategy for accessing an online database.

6. Execute an online search.

   * The student will execute an online search using the strategy he/she has developed.

7. Recognize the need for search modification and refinement.

   * The student will identify and correct improper search strategies.

   * The student will demonstrate effective use of at least one special feature.

   * The student will respond interactively with the computer when online.

SECTION FOUR: Recordkeeping and Evaluation

1. Maintain appropriate logs.

   * The student will explain why recordkeeping is important.

   * The student will identify the parts of a terminal log, student record sheet and logon/off messages.

   * The student will complete the terminal log and record sheets for his/her individual search.

2. Read and evaluate printout for relevant citations.

   * The student will identify the fields on a sample printout.

   * The student will identify those relevant citations from his/her own printout.

3. Determine cost effectiveness of a search.

   * The student will identify the number of relevant citations from a sample search and compute the cost per relevant citation.

   * The student will compute the cost effectiveness of his/her own search.

4. Retrieve relevant documents.

   * The student will identify local and outside sources for possible document retrieval.

   * The student will list relevant items which can possibly be retrieved from outside sources.

   * The student will obtain a minimum of one item listed on the printout from an outside source and estimate the cost of such retrieval.

* The student will identify the parameters as stated in the copyright laws for using and copying the work of others.

5. Review search strategy to improve the number of relevant citations.

   * The student will examine a sample search to prioritize possible revisions in search strategy and identify ways of altering the strategy to improve the number of relevant citations.

6. Compare the results of a manual search to the results of a similar online search.

   * The student will list the advantages and disadvantages of online database searching.

   * The student will compare citations from an online search to those of a manual search and list the differences found.

7. Determine the actual use and/or utility of the retrieved items to the topic as a result of an online search.

   * The student will list each item retrieved and summarize its actual use in the final paper or bibliography.

PLANNED COURSE FOR LIBRARY MEDIA CURRICULUM

SECTION ONE: Information in Our Society GRADE LEVEL: 10-12 TOTAL HOURS SECTION ONE _____

| QUALITY GOALS 1-12 | Code: I = Introduced R = Reteach/Review M = Mastery at this level E = Enrich/Expand — COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|
| 1,2,6 | 1. Explain the role of information in our society. | I | 1.1 The impact of information on our society.<br>1.1.1 Importance of Megatrends by John Nesbitt<br>1.1.2 Growth of information<br>1.1.3 Collection and dissemination of information. | Video or 16mm: Goodbye Guttenburg<br>(Local IU)<br>Newspapers, Magazines | 1.1 The student will participate in a class discussion on the impact of information in our society.<br>1.2 Student will gather information about the use of information in our society. | 1.1 Teacher will evaluate class discussion.<br>1.2 Teacher will evaluate materials gathered. |
| 1,6,11 | 2. Select and refine a topic.<br>(Lesson Plan Available) | R | 2.1 Statement of Topic.<br>2.2 Identification of major terms/concepts of topic.<br>2.3 Identification of available resources for background information.<br>2.4 Narrowing/broadening of topic | General ency., specialized ency. & ref. books; almanacs; atlas; handbooks; vertical file; Reader's Guide; card catalog<br>Locally produced teaching aids/ worksheet | 2.1-2.4 Student will state topic within the context of assignment in at least one but no more than three sentences. | 2.1-2.4 Approval of topic:<br>a. Scope of topic:<br>- to length of assignment<br>- to type and variety of material available & required by assignment.<br>- to academic ability of student. |

SECTION ONE: Information in Our Society (Continued)

| QUALITY GOALS 1-12 | Code: I = Introduced, R = Reteach/Review, M = Mastery at this level, E = Enrich/Expand — COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|
| | | | | | | b. Appropriate background resources<br><br>c. Appropriate 3-5 aspects of topic. |
| 1,3,6 | 3. Produce a working annotated bibliography.<br><br>NOTE: This skill is best taught as an integrated activity with an English or History requirement<br><br>(Lesson Plan Available) | R | 3.1 General review of specialized references as applicable to topic<br><br>3.2 Description of content of annotation. | Specialized references as indicated by topic<br><br>Locally produced teaching aids | 3.1-3.2 Student will produce a working annotated bibliography of print and nonprint resources. | 3.1-3.2 Bibliography will be evaluated for:<br>- relevant sources<br>- complete bibliographic citation<br>- appropriate content of annotation<br>- appropriate number of resources<br>- variety/type of resources |
| | 4. Conduct a manual search. | R | 4.1 Assign a manual search on same topic as sample search using:<br>a. encyclopedia<br>b. periodical index<br>c. card catalog<br>d. vertical file<br>e. other | Local library resources. | 4.1 Student will complete a manual search. | 4.1 Evaluation of manual search. |
| 3 | 5. Develop an awareness of online searching as an information tool.<br><br>(Lesson Plan Available) | I M | 5.1 Definition of online searching.<br><br>5.2 Demonstration of online searching. | Documentation from vendor<br><br>Locally produced teaching aid | 5.1 Student will define terminology associated with online bibliographic searching. | 5.1-5.2 Group discussion on information presented in lecture/demonstration. |

SECTION ONE: Information in Our Society (Continued)

| Code: I = Introduced<br>R = Reteach/Review<br>M = Mastery at this level<br>E = Enrich/Expand | I<br>R<br>M<br>E | | | | |
|---|---|---|---|---|---|
| QUALITY GOALS 1-12 COURSE OBJECTIVES | | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
| | | | Computer/terminal modem<br><br>Communication software<br><br>Printer (optional)<br><br>Large screen monitor (optional) | 5.2 Student will observe an online demonstration. | |

PLANNED COURSE FOR LIBRARY MEDIA CURRICULUM

SECTION TWO: Developing a Search Strategy GRADE LEVEL: 10-12 TOTAL HOURS SECTION TWO _____

| QUALITY GOALS 1-12 | Code: I = Introduced, R = Reteach/Review, M = Mastery at this level, E = Enrich/Expand — COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|
| 1,2, 3,6 | 1. Recognize major concepts in problem statements. | I R | 1.1 Explain how to choose major concepts from narrowed problem statement. | Teacher prepared examples based on curriculum related subject | 1.1 Student will identify major concepts in problem statement. | 1.1.a Given a list of problem statements, student will point out major concepts.<br>1.1.b Student will identify major concepts in his/her own problem statement. |
| 1,2,3,6, 8,9,10 | 2. Use available printed guides and aids to databases. | I R | 2.1 Identify and explain content of available database guides and aids. | Handouts of lists, examples and sample entries of database guides and aids from BRS, DIALOG, etc. | 2.1 Student will select database(s) most appropriate for search. | 2.1 Teacher prepared exercises and/or quiz. |
| 1,2,3, 6,8,9,10 | 3. Use printed guides to specific databases. | I R | 3.1 Explain basic structure and components of the database aid page. | Examples shown or handed out of sample aid page | 3.1 Student will extract and apply key points from the printed aid page necessary for successful searching. | 3.1 Teacher prepared exercises and/or quiz. |

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SECTION TWO: Developing a Search Strategy (Continued)

| QUALITY GOALS 1-12 | | Code: I = Introduced, R = Reteach/Review, M = Mastery at this level, E = Enrich/Expand<br>COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|---|
| 1,2, 4,6 | 4. | Choose appropriate key words synonyms and variations for entry<br><br>(Lesson Plan Available) | I R | 4.1 Explain:<br>a. key words from major concepts<br>b. common synonyms and use of thesauri<br>c. truncation<br>d. variant spellings<br>e. proper names | Teacher prepared worksheets with examples<br><br>Printed thesauri, e.g., Sears<br>LC headings<br>Eric Thesaurus | 4.1 Student will compile a list of searchable terms using, where appropriate, truncations, variant spellings and proper names. | 4.1 Evaluation of completed worksheets and/or quiz. |
| 1,2,6 | 5. | Use logical operators.<br><br>(Lesson Plan Available) | I | 5.1 Explain:<br>a. Boolean logic using Venn diagrams<br>b. positional operators | Teacher prepared transparencies, handouts or commercially prepared handbooks or manuals such as DIALOG'S or BRS' training manuals. Also, worksheets | 5.1 Student will combine search terms listing appropriate logical operators to define and limit a topic. | 5.1 Objective test. Evaluation of worksheets. |
| 1,2,6 | 6. | Choose appropriate search strategy. | I | 6.1 Illustrate the differences between free text and controlled vocabulary searching by comparing same search performed both ways. | Printouts, handouts | 6.1 Student will distinguish between free text vs. controlled vocabulary searching. | 6.1 Class discussion. |
| 1,2, 6,11 | 7. | Use basic system protocol (features).<br><br>(Lesson Plan Available) | I | 7.1 Explain:<br>a. calling up appropriate database<br>b. keying in basic search statement(s) | Locally prepared transparencies and handouts | 7.1 Student will prepare a basic written outline of a search using system protocol. | 7.1 Teacher review of student written outline. |

SECTION TWO: Developing a Search Strategy (Continued)

| QUALITY GOALS 1-12 | | Code: I = Introduced R = Reteach/Review M = Mastery at this level E = Enrich/Expand COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|---|
| | | | | c. printing sample records<br>d. printing results | | | |
| 1,2,11 | 8. | Use advanced system protocol. | I | 8.1 Explain:<br>a. limiting functions<br>b. search specific paragraphs/fields<br>c. changing databases<br>d. saving search strategies<br>e. expand/root<br>f. display | BRS manuals<br>DIALOG manuals;<br>Locally produced transparencies, handouts, etc. | 8.1 Student will prepare a search using advanced system protocol. | 8.1 Teacher review of student designed strategies. |

PLANNED COURSE FOR LIBRARY MEDIA CURRICULUM

SECTION THREE: Conducting a Search GRADE LEVEL: 10-12 TOTAL HOURS SECTION THREE _____

Code: I = Introduced, R = Reteach/Review, M = Mastery at this level, E = Enrich/Expand

| QUALITY GOALS 1-12 | | COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|---|
| 1,4,6 | 1. | Develop an awareness of the telecommunication process. | I | 1.1 Introduce telecommunications.<br><br>1.1.1 Equipment:<br>a. telephone<br>b. modem<br>c. microcomputer/ software or terminal/ software<br>d. Dialnet<br>e. Direct Access<br><br>1.1.2 Network:<br>a. Tymnet<br>b. Telenet<br>c. Uninet<br>d. Dialnet<br>e. Direct access | Telecommunication chart (overhead or handout)<br><br>BRS Brief System Guide<br><br>Pocket Guide to Dialog Information Retrieval Service | 1.1 Student will discuss the various components of telecommunications. | 1.1 Teacher evaluation of class participation. |
| | 2. | Develop a step-by-step procedure for logging on and off. | I | 2.1 Explain logon procedure.<br>2.1.1 Network logon.<br>2.1.2 Vendor logon.<br><br>2.2 Discussion of security and system passwords. | | 2.1 Student will write the step-by-step procedure for logging on and off.<br><br>2.2 Student will logon and logoff. | 2.1 Teacher evaluation of written exercise.<br><br>2.2 Teacher evaluation of logon/logoff. |

SECTION THREE:: Conducting a Search (Continued)

| QUALITY GOALS 1-12 | Code: I = Introduced R = Reteach/Review M = Mastery at this level E = Enrich/Expand<br>COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|
| | | | | | 2.3 Student will demonstrate an awareness of the importance of system security. | 2.2 Teacher evaluation of class discussion. |
| 6 | 3. Locate, identify and use special function keys to break and correct errors.<br>(Lesson Plan Available) | I | 3.1 Explain the location and identification of special function keys:<br>a. break<br>b. backspace<br>c. line deletion | Information systems and microcomputer/ terminal manuals<br>Teacher prepared keyboard chart | 3.1 Student will demonstrate competency in the use of special function keys. | 3.1 Teacher prepared exercise. |
| 2,6,10 | 4. Identify and explain elements of sample search. | M | 4.1 Explain sample search.<br>4.1.1 search techniques<br>4.1.2 citations | Sample search for each student<br>Second sample search for each student for quiz | 4.1 Student will identify and explain the components of sample search | 4.1 Quiz on sample search. |
| 1,2,6,10 | 5. Develop a search strategy for using online databases. | I R | 5.1 Demonstrate skills in writing an effective search strategy.<br>5.1.1 logon/off procedures<br>5.1.2 well-defined concept statement<br>5.1.3 appropriate search terms and logic<br>5.1.4 correct syntax | Information systems manuals, database guides, indexes, where applicable | 5.1 Student will write an effective strategy for use online. | 5.1 Teacher evaluation of student strategy. |

SECTION THREE:: Conducting a Search (Continued)

| QUALITY GOALS 1-12 | Code: I = Introduced R = Reteach/Review M = Mastery at this level E = Enrich/Expand COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|
| 2,6,10 | 6. Execute an online search. | I | 6.1 Review written search strategy. | Microcomputer/ terminal, information systems manuals and database guides | 6.1 Student will execute an online search using the strategy she/he developed. | 6.1 Teacher evaluation of search |
| 1,2,6,10 | 7. Recognize the need for search modification and refinement. | I R | 7.1 Printout and explain common errors in search strategies:<br>a. incorrect use of operators<br>b. incorrect use of descriptors<br>c. syntax errors | Sample problem searches | 7.1 Student will identify and correct improper search strategies. | 7.1 Teacher evaluation of corrected searches. |
| | | | 7.2 Explain various special features:<br>a. temporary save/ interrupt (sign off continue)<br>b. cross-postings database<br>c. thesauri, descriptor listings | Information systems manuals | 7.2 Student will demonstrate at least one special feature. | 7.2 Teacher evaluation of use of special feature. |
| | | | 7.3 Explain process of responding interactively to online results:<br>a. narrow/broaden topic<br>b. print sampling of citations to determine relevancy | | 7.3 Student will respond interactively with computer when online. | 7.3 Teacher evaluation of student reactions. |

SECTION THREE:: Conducting a Search (Continued)

| Code: I = Introduced<br>R = Reteach/Review<br>M = Mastery at this level<br>E = Enrich/Expand<br>QUALITY GOALS 1-12 COURSE OBJECTIVES | I<br>R<br>M<br>E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|
| | | c. choose additional search terms when necessary<br>d. Print appropriate fields of relevant citations. | | | |

PLANNED COURSE FOR LIBRARY MEDIA CURRICULUM

SECTION FOUR: Recordkeeping and Evaluation GRADE LEVEL: 10-12 TOTAL HOURS SECTION FOUR _____

| QUALITY GOALS 1-12 | | Code: I = Introduced, R = Reteach/Review, M = Mastery at this level, E = Enrich/Expand — COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|---|
| 1,2,6,11 | 1. | Maintain appropriate logs.<br><br>(Lesson Plan Available) | I | 1.1 Introduce recordkeeping. | | 1.1 Student will explain why recordkeeping is important. | 1.1 Class discussion. |
| | | | | 1.2 Introduce terminal log. | Sample terminal log and transparency | 1.2 Student will identify parts of log and explain terminology in logon/logoff messages. | 1.2 Evaluation of computer worksheet. |
| | | | | 1.3 Introduce student record sheet. | Sample student record sheet and transparency | 1.3 Student will complete a log and student record sheets. | 1.3 Evaluation of completed log and record sheets. |
| | | | | 1.4 Explain:<br>a. logon message<br>b. logoff message<br>c. connect time | Teacher prepared worksheet | | |
| 1,2,6,11 | 2. | Read and evaluate printout for relevant citations.<br><br>(Lesson Plan Available) | I | 2.1 Review fields in citations:<br>a. accession number<br>b. author<br>c. title<br>d. source, date<br>e. abstract<br>f. descriptors, identifiers<br>g. other | Sample printout, transparency and teacher prepared worksheet | 2.1 Student will identify fields on a sample printout. | 2.1 Evaluation of completed worksheet. |

SECTION FOUR: Recordkeeping and Evaluation (Continued)

| QUALITY GOALS 1-12 | Code: I = Introduced R = Reteach/Review M = Mastery at this level E = Enrich/Expand<br>COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|
| | | | 2.2 Define relevant: Those items which would appear to be useful in the development of a topic. | Student individual printouts | 2.2 Student will identify relevant citations from his/her own search. | 2.2 Evaluation of student searches. |
| 1,2,6 | 3. Determine cost effectiveness of search.<br>(Lesson Plan Available) | I | 3.1 Explain cost effectiveness formula; total cost divided by the number of relevant citations. | Sample search and transparency | 3.1 Student will identify the number of relevant citations and compute cost.<br>3.2 Student will compute the cost effectiveness of his/her own search. | 3.1 Evaluation of final cost figures.<br>3.1.2 Evaluation of final cost figures. |
| 1,2,4, 6,11 | 4. Retrieve relevant documents. | R | 4.1 Review current library resources. | Listing of resources | 4.1 Student will identify local and outside sources for document retrieval. | 4.1 Review by instructors. |
| | | | 4.2 Discuss resource sharing:<br>a. ACCESS PA<br>b. community<br>c. ILL<br>d. other | Pa. and local ILL guidelines | 4.2 Student will list relevant items which can possibly be obtained from outside sources. | 4.2 Evaluation of student list. |
| | | | 4.3 Discuss costs of resource sharing:<br>a. copying<br>b. electronic mail<br>c. ILL charges<br>d. U.S. mail<br>e. other | List of resource costs when applicable | 4.3 Student will obtain at least one item from an outside source and estimate the cost of retrieval. | 4.3 Teacher check of document retrieval. |

SECTION FOUR: Recordkeeping and Evaluation (Continued)

| QUALITY GOALS 1-12 | | Code: I = Introduced R = Reteach/Review M = Mastery at this level E = Enrich/Expand COURSE OBJECTIVES | I R M E | CONTENT | RESOURCES/ MATERIALS | EXPECTED LEVELS OF ACHIEVEMENT | PROCEDURES FOR EVALUATION |
|---|---|---|---|---|---|---|---|
| | | | | 4.4 Copyright law overview. | Summary of copyright law and short quiz | 4.4 Student will identify the parameters as stated in the copyright laws for using and copying the work of others. | 4.4 Evaluate short quiz and participation in class discussions. |
| 1,6,11 | 5. | Review search strategy to improve the number of relevant citations.<br><br>(Lesson Plan Available) | R | 5.1 Review original search statement from sample search. Discuss possible changes:<br>a. other databases<br>b. other key words<br>c. synonyms<br>d. other techniques<br>e. revised logic | Sample search and transparency | 5.1 Student will prioritize possible revisions of sample search and identify ways of altering the strategy to improve the number of citations. | 5.1 Teacher review. |
| 1,2,3<br>6,11 | 6. | Compare the results of a manual search to the results of a similar online search.<br><br>(Lesson Plan Available) | R | 6.1 Review the advantages and disadvantages of online searching.<br><br>6.2 Discuss comparisons:<br>a. time<br>b. recovery<br>c. cost | Sample online search<br><br>Sample from 6.1 plus students' manual searches | 6.1 Student will list the advantages and disadvantages of online database searching.<br><br>6.2 Student will compare citations from a manual search to those retrieved from an online search and list the differences found. | 6.1 Class discussion of results.<br><br>6.2 Teacher evaluation of list. |
| 1,2,6,11 | 7. | Determine the actual use and/or utility of the retrieved items to the topic in the final paper or bibliography. | R | 7.1 Guide students as they review items. | Students' own retrieved items | 7.1 Student will list each item retrieved and summarize its actual use in the final paper or bibliography. | 7.1 Teacher evaluation of the student summary. |

## LESSON PLANS

Lesson plans have been developed for some of the competencies and student outcomes. On the scope and sequence chart, these are indicated under course objectives. An example is as follows:

Section One, Objective 2.

Select and refine a topic

(Lesson Plan Available)

These plans list the activities for the librarian and the student. Information is also provided regarding what resources are needed to teach the lesson and suggestions are made about procedures which can be used to evaluate student achievement.

It is anticipated that these plans will help the librarian organize materials and procedures to be used in the teaching/learning process.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Select and refine a topic. (Section One, 2.1 - 2.4)

STUDENT OUTCOME: Select and refine a topic in at least one but no more than three sentences.

## ACTIVITIES

### Librarian

1. Demonstrate how to select topic and identify major terms of topic.
2. Suggest available resources for background information.
3. Distribute worksheet.
4. Demonstrate how to narrow/broaden topic.
5. Conference with student to narrow or broaden and approve final topic.
6. Initial final topic.

### Student

1. State a topic within context of assignment.
2. Complete the worksheet which identifies initial topic, 3-5 different aspects of the topic and list of sources consulted for background information.
3. Write a working statement of the topic.
4. Conference with teacher to narrow or broaden and approve final topic.
5. Write final topic in at least one but no more than three sentences.

RESOURCES NEEDED:

REFERENCES: General encyclopedia, special encyclopedia and reference books as subject demands; almanacs; handbooks; readers guides; vertical file, card catalog.

AUDIO VISUAL: Locally produced teaching aids for demonstration worksheet.

EQUIPMENT: None.

EVALUATIVE PROCESS: Approval of topic depends on:

- Scope of topic appropriate to length of assignment.
- Scope of topic appropriate to type and variety of material available and requirement.
- Appropriateness of 3-5 aspects of topic identified.
- Appropriateness of background resources consulted.
- Scope of topic appropriate to academic ability of student.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Produce a working annotated bibliography. (Section One, 3.1 - 3.2)

STUDENT OUTCOME: Produce a working annotated bibliography of print and nonprint resources.

NOTE: This skill is best taught as an integrated activity with an English or History requirement.

## ACTIVITIES

Librarian

1. General review of specialized references as applicable to assignment.
2. Lecture/demonstration on writing annotations.
3. Distribute assignment.

Student

1. Identify appropriate sources on topic.
2. Locate appropriate sources on topic.
3. Select appropriate sources on topic.
4. Read selected sources.
5. Write annotations to describe relevance of sources to topic.
6. Compile an annotated bibliography.

RESOURCES NEEDED:

REFERENCES: Specialized references as indicated by topic.

AUDIO VISUAL: Handouts

1. Sample and content of an annotation.
2. Student assignment.
3. Specialized bibliography with local call numbers.

EQUIPMENT: None.

EVALUATIVE PROCESS: Instructor will evaluate bibliography for:

- Sources relevant to topic.
- Complete bibliographic citation.
- Appropriate descriptive content in annotation.
- Appropriate number of resources for topic.
- Variety of types of resources (if appropriate to topic).

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Develop an awareness of online searching as an information tool.
(Section One, 5.1 - 5.2)

STUDENT OUTCOMES:
1. Define terminology associated with online bibliographic searching.
2. Observe an online search demonstration.

## ACTIVITIES

### Librarian

1. Discuss the following:
   a. Online Searching - what it is, terminology, what to expect from a search.
   b. Advantages - currency; speed; comprehensiveness (scope and variety); search on 2-3 terms at a time.
   c. Disadvantages - costs; downtime; document retrieval; limited choice of databases in some disciplines; knowledge of protocols/ vocabulary to perform search.
2. Demonstrate on online bibliographic search.

### Student

1. Observe demonstration and participate in lecture.

RESOURCES NEEDED:

REFERENCES: Documentation from vendor.

AUDIO VISUAL: Locally produced teaching aids: handout: glossary of terms; handout: photocopy of printout.

EQUIPMENT: Computer/terminal; modem communication software; printer (optional), large monitor screen (optional)

EVALUATIVE PROCESS: Group discussion on information presented in lecture/demonstration.

ALTERNATIVES: 1. Use off line disk to demonstrate search.

2. All lecture: use transparencies of printout to show results of search.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Choose appropriate key words, synonyms and their variations suitable for entry into an online search system. (Section Two, 4.1)

STUDENT OUTCOMES: Complete a list of searchable terms using, where appropriate, truncations, variant spellings, and proper names.

## ACTIVITIES

### Librarian

1. Introduce unit and distribute lesson outline and worksheets.
2. Explain thesauri structure; i.e., hierarchical arrangement and give one sample page handouts.
3. Explain truncation.
4. Explain variant spellings.
5. Explain entry form of proper names.
6. Assign additional worksheets and explain requirements.
7. Evaluate final worksheet assignment and/or give quiz.

### Student

1. Using key words from major concepts given on a worksheet, and at least one of the suggested thesauri, prepare a list of at least two searchable terms.
2. Given the list of searchable terms, complete a worksheet on truncation and variant spellings with 80% accuracy.
3. Given a list of proper names, formulate the correct entry format with 80% accuracy.

RESOURCES NEEDED:

REFERENCES: Suggested thesauri: Sears List of Subject Headings, Library of Congress Subject Headings, Eric Thesaurus.

HANDOUTS: Sample page from Thesaurus.

AUDIO VISUAL: Locally prepared transparencies.

EQUIPMENT: Overhead projector.

EVALUATIVE PROCESS: Instructor will evaluate student worksheets and/or quiz. Student should achieve 80% accuracy on worksheets and/or quiz.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Use logical operators. (Section Two, 5.1)

STUDENT OUTCOME: Combine search terms listing appropriate logical operators to define and limit a topic.

## ACTIVITIES

### Librarian

1. Introduce unit and distribute outlines and worksheets.
2. Explain Boolean logic using Venn diagrams.
3. Explain positional operators.
4. Assign final worksheets and/or quiz.

### Student

1. Given a list of searchable terms, use the three basic Boolean logical operators (AND, OR, NOT) to define and limit a concept with 80% accuracy.
2. Given a list of searchable terms, use the positional operators to define and limit a concept with 80% accuracy.

RESOURCES NEEDED:

AUDIO VISUAL:
1. Locally prepared worksheets (a) Boolean logical operators; (b) positional operators.
2. Final worksheets and quiz.
3. Locally produced transparencies.

REFERENCES: DIALOG Workbook; BRS Training Workbook; University of Pittsburgh: Manual for Online Training Center, No. 3, BRS.

EQUIPMENT: Overhead Projector

EVALUATIVE PROCESS: Instructor will evaluate student worksheets and/or quiz. Students should achieve 80% accuracy.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Use basic system protocol required for online searching. (Section Two, 7.1)

STUDENT OUTCOME: Prepare an outline using basic system protocol in proper sequence.

## ACTIVITIES

Librarian

1. Introduce lesson and distribute lesson outlines and worksheets.
2. Explain how to logon to a database.
3. Explain keying in basic search statement(s).
4. Explain printing of sample records.
5. Assign outline and explain requirements.

Student

1. Complete worksheets as topics are covered.
2. Prepare required outline.

RESOURCES NEEDED:

REFERENCES: Documentation from vendor.

AUDIO VISUAL:
1. Locally prepared transparencies.
2. Handouts of outlines and worksheets.

EQUIPMENT: Overhead Projector.

EVALUATIVE PROCESS: Student outline must demonstrate proper sequence of steps.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Locate, identify and use special function keys to break printing and correct errors. (Section Three, 3.1)

STUDENT OUTCOME: Demonstrate competency in the use of special function keys.

## ACTIVITIES

### Librarian

1. Using computer equipment and/or transparency of keyboard chart explain and/or demonstrate the function of these keys and when they are used:

   a. BREAK -

      - To stop printing online. [On some terminals there is a break key. On others, holding down control/alternate key and another key acts as a break. On still others, depending on the software, a break key can be user-defined.]

   b. BACKSPACE

      - To correct errors. [To backspace on all equipment, hold down control key and H. NOTE: On some equipment, a backspace or left arrow-key will also work. Once you have backspaced, re-enter all characters from that point on.]

   c. LINE DELECTION

      - To erase an entire line before sending to vendor. [On BRS, type "?" and (cr). On DIALOG, hit escape key then (cr).]

   d. CARRIAGE RETURN/ENTER

      - To send search statement to vendor. [In documentation, often indicated by (cr).]

### Student

1. Participate in discussion of lecture concerning special function keys.

2. Orally identify keys and their functions using equipment and/or transparency.

RESOURCES NEEDED:

REFERENCES: BRS Information Technologies User Guide
DIALOG Systems Manual

AUDIO VISUAL: Transparency-Keyboard Chart

EQUIPMENT: Overhead projectors; information systems; microcomputer terminal

EVALUATIVE PROCESS: Student will indicate the use of each key on keyboard chart or on equipment.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Maintain appropriate logs.
(Section Four, 1.1 - 1.3)

STUDENT OUTCOME: Maintain a recordkeeping system.

## ACTIVITIES

### Teacher

1. Introduce recordkeeping and its importance.
2. Explain sample terminal log and student record sheet: name, date, databases used, cost, time, other.
3. Explain logon/logoff message.
4. Explain running totals.
5. Complete sample terminal log, student record sheet.
6. Distribute and give instructions for worksheet.
7. Evaluate worksheet.
8. Check student record sheets and terminal log when complete.

### Student

1. Complete sample terminal log and student record sheet.
2. Complete worksheet.
3. Complete terminal log and individual record sheet for his/her own search.

RESOURCES NEEDED:

AUDIO
VISUAL: Transparencies of Record Sheets and Logon/Off Messages

HANDOUTS: Sample Individual Record Sheets
Sample Terminal Log
Sample Logon/Off Message
Teacher Prepared Worksheet
Individual Student Search Printouts

EQUIPMENT: Overhead Projector

EVALUATIVE PROCESS:

1. Instructor will evaluate completed worksheets.
2. Instructor will evaluate completed student records.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Read and evaluate printout for relevant citations. (Section Four, 2.1 - 2.2)

STUDENT OUTCOME: Identify fields in a search and evaluate printout for relevant citations.

## ACTIVITIES

### Librarian

1. Review fields in citations:

   a. accession number
   b. author
   c. title
   d. source, date
   e. abstract
   f. descriptors, identifiers
   g. other

2. Define relevant: those items which could possibly be used in the development of topic.

3. Using sample printout, discuss each citation and the fields which are used to determine it as relevant or nonrelevant.

### Student

1. Complete teacher prepared worksheet.

2. Using individual student search results, mark each citation printout as relevant or nonrelevant.

RESOURCES NEEDED:

AUDIO VISUAL: Transparency of Sample Printout

HANDOUTS: Sample Printout
Teacher Prepared Worksheet
Student Individual Search Results

EQUIPMENT: Overhead Projector

EVALUATIVE PROCESS: Instructor will evaluate individual search results with each student.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Determine cost effectiveness of a search. (Section Four, 3.1 - 3.2)

STUDENT OUTCOME: Compute the cost-effectiveness of a search.

## ACTIVITIES

Librarian

1. Explain cost-effectiveness formula: total cost/number of relevant citations.

2. Demonstrate use of cost-effectiveness formula using sample search printout.

Student

1. Count the number of relevant citations.

2. Complete calculation of cost-effectiveness of online search.

RESOURCES NEEDED:

AUDIO VISUAL: Transparency of Sample Search

HANDOUTS: Sample Search Printout Copies
Student Individual Search Results

EQUIPMENT: Overhead Projector

EVALUATIVE PROCESS: Instructor will evaluate individual student printouts and calculations.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Review search strategy to improve the number of relevant citations.
(Section Four, 5.1 - 5.2)

STUDENT OUTCOME: Prioritize possible revisions of sample search and identify ways of altering the strategy to improve the number of citations.

## ACTIVITIES

### Librarian

1. Review original search strategy of sample search.

2. Identify changes in strategy which could have been made:

   a. Other databases
   b. Other key words, synonyms
   c. Other techniques, features
   d. Revised logic

3. Lead discussion of changes and how they might affect search results.

4. Prioritize identified changes for sample search.

5. Evaluate prioritized lists completed by students.

### Student

1. Participate in discussion and identify changes which might be made.

2. Prepare a prioritized list of changes which could be made to individual search strategy to improve the number of citations.

RESOURCES NEEDED:

AUDIO VISUAL: Transparency of Original Search Strategy

HANDOUTS: Original Search Strategy for Sample Search
Individual Student Search Printouts

EQUIPMENT: Overhead Projector

EVALUATIVE PROCESS: Instructor will review and evaluate student's prioritized listing.

Grade Level 10-12

## LESSON PLAN

LESSON OBJECTIVE: Compare the results of a manual search to the results of a similar online search.
(Section Four, 6.1 - 6.2)

STUDENT OUTCOMES:

1. List the advantages and disadvantages of online database searching.
2. Compare citations from a manual search to those retrieved from an online search.

## ACTIVITIES

### Librarian

1. Review the advantages and disadvantages of online searching.
2. Divide students into groups and supervise group work/assignments.
3. Direct discussion of the comparison of the results of the two searches.

### Student

1. Prepare a list of advantages and disadvantages of online searching.
2. Using a previous manual search, participate in a discussion and explain differences found between the two searches (especially quality, quantity, recency, access, and cost).

RESOURCES NEEDED:

REFERENCES: Appropriate Resources for Manual Search Groups - indexes, encyclopedias, card catalog, vertical file, other.

HANDOUT: Sample search printout

AUDIO VISUAL: Transparency of sample search printout.

EQUIPMENT: Overhead Projector

EVALUATIVE PROCESS: Instructor will evaluate search results and discussion.

# SECTION II- Online Management

## INTRODUCTION

After the decision has been made to teach online searching skills, the librarian must assess the availability of current resources. In many instances some or all of the necessary hardware and software needed to go online may be in place in the library. The librarian should also utilize any available faculty expertise.

In some schools it may not be possible to implement an online searching curriculum utilizing actual online procedures because of the lack of equipment or funds. These guidelines include suggestions in Section I for teaching online skills "offline."

## BUDGET AND COST

Online reference services entail costs above and beyond those of traditional reference and general library services. Online searching requires special professional skills, additional policies, and financial considerations which include the cost of computer hardware and software. An important component of any online search service is a creative, flexible, and relevant budget.

The costs involved in online searching can be divided into two categories: direct and indirect. Direct costs are the costs incurred by an online search session. Indirect costs include all other expenses.

I. Direct Costs
   A. Search Sessions
(*) 1. connect time including applicable royalties
(*) 2. telecommunications to include network and long distance charges
(*) 3. citation charges
(*) 4. searcher's time

II. Indirect Costs
   A. Acquisitions
      1. equipment
         a. terminal
         b. modem
         c. telephone
         d. printer
(*)      e. maintenance contract(s)

      2. supplies and documentation
         a. printer paper, ribbons
         b. terminal software
         c. manuals
         d. thesauri
         e. subscriptions

B. Operating Expenses
   1. personnel
      a. searchers
      b. support staff

   2. training expenses
      a. database training/seminars
      b. practice time online
      c. travel

   3. promotion
(*)   a. printing and graphics
(*)   b. demonstration time online

   4. overhead
      a. facility use and/or modification
      b. furniture
      c. utilities

The budget items that will be continuing costs are those preceded by an asterisk. In addition, monies should be set aside each year to purchase items such as printer paper, documentation updates, and other consumables.

VENDORS

Vendor contracts must be established. Contract options vary widely. While there are similarities among those offered by the major vendors, there is no standard. The simplest contract usually involves no start-up fee and requires neither prepayment nor usage guarantee and involves simply a monthly charge for the connect time, telecommunications time, and citation charges.

Some systems automatically discount all accounts after a certain level of usage each month. Most vendors offer higher discount rates in exchange for prepayment or a user guarantee and offer special rates to schools, for student training, demonstrations, and other than prime-time searching.

A list of selected major vendors of bibliographic databases can be found in Appendix D.

GATEWAY SOFTWARE

During the past few years, a number of microcomputer software packages have been produced which translate online searching commands so that users, with little or no training, can search bibliographic databases. At the present time, these packages are called end-user searching systems, front-ends or gateway. Gateway seems a more appropriate term since this type of software enables the user to "pass through" more complex procedures.

Some of the problems which can be addressed by using gateway software are:

1. Memorization of search commands is greatly reduced.

2. Searching costs can be reduced since the microcomputer's memory is used to hold search strategies until such time as the user actually goes online.

3. Search results can be edited electronically to eliminate citations or combine results of several database searches.

Among the packages offered are "Search Helper," "In Search," "Sci-Mate," and "Wilsearch."

"Database Searching With Gateway Software" is an evaluation of "Search Helper" by Henry Peseiotta, Fine Arts Libraries, Carnegie-Melon University Library which can be found in Art Documentation: Bulletin of the Art Libraries Society of North America, Vol. 4, No. 1, Sperry 1985, p. 3-5.

An evaluation of "Sci-Mate" can be found in the July 1984 issue of the Datapro Directory of Microcomputer Software.

"In Search" evaluations can be found in Computing for Business, November 1984, p. 64 and Personal Computing, June 1984, p. 52.

It is recommended that librarians interested in "gateway" programs read these evaluations before sending for preview programs.

TELECOMMUNICATIONS

In order to acquire access to databases stored in mainframe computers located in other sites, microcomputer users must use telephone lines and modems to make the appropriate connection. The telephone line charge would be very high if a user had to pay long distance phone rates when calling a computer in another state, across the nation or in Canada. Several companies have developed telephone line systems that will interconnect the many databases and provide toll free connections for most of the cities and larger towns. These connections are called nodes. Nodes provide access to tremendous amounts of information resources for the average person at low cost and without long distance phone charges when the user is close to a node. Most of these systems have an 800 number that is available when the microcomputer is a long distance away from a node. Some additional cost results from using the 800 number, but it is cheaper than long distance. Businesses also use these services for their data processing information transfer.

The major companies supplying this type of interconnection services are:

1. GTE's TELENET
2. Tymshare's TYMNET
3. UniNet Inc.'s UNINET
4. DataPac Services in Canada

These systems all provide the same basic networking communication services and differ only in cost, node location and a few sign-on procedures. Their charges are the same regardless of where the microcomputer and the main frame computers are located. The charges for these services are normally built into the cost paid to connect to the database. These services are so easy to use

that you only have to dial a telephone number to connect to the service then identify the database you wish to call.

This system of interconnection is provided by the company leasing special telephone lines for data communications and then servicing many users at the same time through a special method of information transmission called "packet switching."

When connecting into a database vendor and/or telecommunications carrier it is imperative to use the correct protocol which includes characteristics of the equipment, carriers' requirements, and vendors' requirements. You can obtain the proper parameters by contacting the database vendor or the telecommunications carriers.

A list of the major telecommunications carriers can be found in Appendix E.

## COPYRIGHT

Librarians should be aware that information from online databases may be protected by the Copyright Law. Most databases permit or authorize one-time use of information retrieved from their files by a single end-user. However, sale or wide distribution of search results may not be permitted. As copyright restrictions are often database specific, librarians should review instructions for each database producer or vendor before searching and utilizing the results. Inquiries concerning the search results for educational purposes should be made directly to the database producer or vendor.

## SECURITY

There are five major areas of security to be considered when preparing to start an online curriculum or service.

1. Equipment
2. Software
3. Telephone access
4. Passwords
5. Confidentiality

The first three are probably already covered by current institutional policies. However, security for passwords and confidentiality should be addressed before any logon procedures take place. A password is like a blank check since it allows the user access to online searching while all charges are being added to the institution's bill. Caution should be taken so that only authorized users have access to the password. The secondary level password can be changed as often as necessary and this procedure will strengthen security. When in full duplex, the passwords will not appear on the screen.

Through all phases of the search, the confidentiality of the patron must be maintained. When keeping logs or records of searches performed, the identification of the requestor should be protected.

## RECORDKEEPING

Recordkeeping is an essential part of teaching online searching skills. Data collected and summarized can be used to evaluate current use and predict future use. The information can also be used for budget proposals and annual reports. Three types of records or forms are recommended for use:

1. Individual Search Record Sheet

   This record sheet is completed by each student as they finish their searches. It should contain: an assigned search number, date, student name, search title, databases used, and connect time and cost.

2. Usage Log or Terminal Log

   This log sheet is completed by the librarian and summarizes the information from the students' search record sheets. To maintain confidentiality of the searches, assigned search numbers should be recorded instead of names. Other information on this log should include: data, connect time and total charges. Usage logs can be summarized on a monthly basis.

3. Yearly Summary Sheet

   Usage logs should be recorded and summarized on an annual basis.

Sample Student Search Records, Usage Logs, and Yearly Summary Sheets can be found in Appendix B.

## COOPERATION AND SUPPORT

Cooperative agreements should be developed among various types of institutions to maximize the potential of online database sources. Both formal and informal agreements related to collection development, resource sharing, and electronic mail should be encouraged. An example of this would be a cooperative development project among several school, public, and academic libraries in a geographical area. Each institution as part of the agreement would develop a more indepth periodical collection in a specific predetermined subject area. All libraries would then share access to the periodicals they hold uniquely.

Librarians, especially those not as familiar with online searching, may seek and find support from several different user or support groups. User groups frequently exist for specific brands of microcomputers. Existence of these can sometimes be determined by contacting local distributors. User groups specific to the various database vendors also exist. Information about them can be obtained through the toll-free numbers provided by each vendor. There may be other schools within a given geographic area who are already engaged in database searching and/or online instruction. Contacting these schools may provide the beginner with additional support and assistance.

## REFERENCES RECOMMENDED FOR PROFESSIONAL COLLECTION

BOOKS


Chen, Ching-Chih and Schweizer, Susanna. Online Bibliographic Searching: A Learning Manual. New York, NY: Neal-Schuman Publishers, Inc., 1981.

Feinchel, Carol H. and Hogan, Thomas H. Online Searching: A Primer. 2nd ed. Medford, NJ: Learned Information, 1984.

Online Searching Techniques and Management, edited by James J. Maloney. Chicago, IL: American Library Association, 1983.


PERIODICAL


Link-Up: Communications and the Small Computer. On-Line Communications, Inc., 3938 Meadowbrook Road, Minneapolis, MN 55426, monthly publication.

THE USE OF ONLINE INFORMATION DATABASES
IN SCHOOL LIBRARY MEDIA CENTERS

ANNOTATED BIBLIOGRAPHY

by Ann Lathrop

"Communicating Via Dialog," INTERFACE AGE, Jon Pepper, August 1984, pp. 72-73.

Descriptive review of DIALOG's Knowledge Index, tailored for the needs of small businesses and home users. Knowledge Index contains more than 4,000,000 references and indexes more than 10,000 journals. It is limited to evenings and weekends. A users' workbook is available.

"Current Trends in Academic Libraries," LIBRARY TRENDS, Thelma Freides, Winter 1983, pp. 457-474.

An especially interesting section of this article is a discussion of what instruction in reference skills and bibliographic searching is appropriate for undergraduate college students. The author addresses the issue of whether students should be trained to do their own online searching or should depend upon the services of professionally trained searchers. The most economical approach is for professionals to complete the searches efficiently.

Inexperienced students, even after training, will probably take much longer to complete a search and are less likely to achieve satisfactory results. Unfortunately, this is paying a higher cost for an inferior product. The time that the librarians spend in training students to search further increases the cost to the institution.

There is another facet to consider, however, before making any decision based primarily on cost or efficiency. "...a bibliographic search is an intrinsic part of the research investigation it starts off, and therefore cannot be sliced away or contracted out...a scholar whose work is criticized on the ground that he failed to consider some important contribution to the literature can hardly defend himself by blaming the librarian who failed to turn up the missing item in his bibliographic search, nor can the student who receives the same criticism from his teacher. Therefore it is not only proper but essential for students to be instructed in databases, search logic, access points, controlled vocabularies and so forth. Granted it all costs money, but it is as legitimate an educational expense as anything else that occurs in classroom or laboratory" (p. 465).

This argument fits my own conviction that we have an obligation to teach students both ABOUT online databases and HOW TO USE THEM, just as surely as we must teach them the skills needed to use other reference tools.

"Database Access Software," LIBRARY JOURNAL, Carol Tenopir, October 1, 1984, pp. 1828-9.

These software packages handle the telecommunications process and logon, simplify the search process, and makes it possible for users to search several systems without learning the individual commands for each. Detailed review of IN-SEARCH. For a review of SEARCH-HELPER, see the June 1, 1984 issue of LIBRARY JOURNAL.

"The Database Industry Today: Some Vendors' Perspectives," LIBRARY JOURNAL, Carol Tenopir, February 1, 1984, pp. 156-7.

Fifteen online vendors share the $129 million being spent annually for online information databases. They offer almost 250 databases from 151 producers. Access speeds are increasing rapidly, with 1200 baud now widely used and speeds up to 9600 baud soon to be available.

THE DIRECT USE OF ONLINE BIBLIOGRAPHIC INFORMATION SYSTEMS BY UNTRAINED END USERS: A REVIEW OF RESEARCH. Michael Eisenberg. 40 pp. ERIC Clearinghouse on Information Resources, 1983.

Bibliographic essay summarizes research and provides extensive references to journal articles and documents in ERIC.

"Educational Databases: Learning About Learning," LINK-UP, Pat Samples, September 1984, pp. 26, 28.

Brief review of ERIC and summaries of other educational databases: Ed-Line, Betnet for bilingual education, NPAN for vocational education, Special Net, and Guidance Information System.

"The Electronic Encyclopedia," ELECTRONIC LEARNING, September 1984, p. 26.

The ACADEMIC AMERICAN encyclopedia, published by Grolier, is now available online from CompuServe and the Dow Jones News/Retrieval service. A pilot program in New Jersey provided unlimited service to students in three libraries via cable installations at two high schools and one elementary school.

"Electronic Encyclopedias," BYTE, Peter R. Cook, July 1984, pp. 151-170.

A Grolier vice president describes a massive database of text and audio-visual materials being created for videotex and videodisc technology. The ACADEMIC AMERICAN ENCYCLOPEDIA has been online for two years through CompuServe, Dow Jones, BRS, Dialog and Vu/Text.

"Free Online Searching in a Public Library System: An Unscientific Study," ONLINE, Georgia Fox Donati and Martha Moss Kreisel, March 1983, pp. 12-19.

Free online searches on selected databases from BRS, DIALOG, and the New York Times Information Bank are offered through the New York State Library, with each county having a monthly allotment. Two problems are the 10-14 day time lag and the inexperience of local librarians in interpreting search requests. This article reports on 503 searches completed in one year for Westchester County libraries. Search request form reproduced in the article could be useful.

"IAC's Document Delivery and More," LIBRARY JOURNAL, Carol Tenopir, June 1, 1984, pp. 1104-1105.

Information Access Company (IAC) produces several popular online databases including MAGAZINE INDEX, NATIONAL NEWSPAPER INDEX, and NEWSEARCH. IAC recently announced a new service, MAGAZINE ASAP and TRADE & INDUSTRY ASAP.

MAGAZINE ASAP and MAGAZINE INDEX are both available on DIALOG. They are complimentary, with ASAP providing a full text database for online search and retrieval of the complete texts of 40 of the most popular of the 400+ magazines in MAGAZINE INDEX. Titles such as Car & Driver, Changing Times, Creative Computing, Modern Photography, Motor Trend, National Review, The New Republic, Popular Science, Rolling Stone, Science, Science 83, Scientific American, and Smithsonian would make this a very useful database for schools.

This new availability of having the full text of selected magazines online makes school use of a database such as MAGAZINE INDEX more attractive, especially at the middle school level where libraries rarely have very complete backfiles of periodicals.

"Influence of Online Bibliographic Services on Student Behavior," JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE, Manfred Kochen, Victoria Reich, and Lee Cohen, November 1981, pp. 412-420.

Two groups of graduate students compiled bibliographies on research topics, with one group having online bibliographic searching conducted by one of the authors. The students did not perceive online searching as being especially useful, and seemed to prefer more traditional manual techniques. Students probably need more experience and training to become confident users of online searching.

"Information at Your Fingertips: How One School is Making it Happen," ELECTRONIC LEARNING, Suzan D. Prince, September/October 1981, pp. 38-40, 63.

Use of The Source for a junior high school project with computer literacy, math, and gifted classes. Students did the searches themselves.

"Information Services: The New Frontier of Communications," ELECTRONIC LEARNING, George Shea, November/December 1984, pp. 33-34, 88-89.

Brief but informative overview of available databases and potential applications in schools.

"In-House Training and Staff Development," LIBRARY JOURNAL, Carol Tenopir, May 1, 1984, pp. 870-871.

Three types of training are described in terms of public library needs: general staff orientation, searcher updating, and basic search training.

"An Introduction to Online Bibliographic Searching for High School Students: A Successful Approach," EDUCATIONAL TECHNOLOGY, Kathleen W. Craver and Lee Allison Dunanian, June 1984, pp. 39-41.

Two classes of college-bound high school students were introduced to online bibliographic searching, taught to develop search strategies, and then had their searches executed by a trained searcher. Students seemed to be pleased with the results of the experience.

"The Knowledge Business: Economic Issues of Access to Bibliographic Information," COLLEGE AND RESEARCH LIBRARIES, Carlton Rochell, January 1985, pp. 5-12.

Information is becoming a commodity with a dollar value attached. This is in contrast to the American tradition of information freely available in libraries. Cooperation between libraries and the private sector is needed to resolve this situation.

"Knowledge Index: A Review," ONLINE, Marydee Djala, September 1983, pp. 31-33.

DIALOG has developed Knowledge Index, a simplified database designed for searching by home users. It offers 16 of the more popular DIALOG databases (as of May 1983) grouped into 11 subject sections. Only 10 commands are required for searching. A user's manual in workbook format was described as very helpful. The reviewer also comments briefly on a similar service, After Dark, offered by BRS. After Dark is menu driven and Knowledge Index is command driven.

"Modern Subject Access in the Online Age," AMERICAN LIBRARIES, Pauline A. Cochrane, March 1984, pp. 145-150.

The topic is subject access to an online card catalog, but the search strategies and training ideas may be applied to searching data bases.

"Newspapers Online," LIBRARY JOURNAL, Carol Tenopir, March 1, 1984, pp. 452-3.

Bibliographic databases that index newspapers, and full text databases with complete newspapers online, are both becoming more common. Some of the newspapers currently available online are the New York Times, Washington Post, Christian Science Monitor, Philadelphia Inquirer, and selected articles from the Wall Street Journal.

"NFAIS Sponsors EasyNet Service," INFORMATION TODAY, September 1984, pp. 1, 14.

EASYNET is a menu-driven online information retrieval service for user-friendly access to BRS, Dialog and SDC. Users do not need to have any training in online searching and all fees are charged to a major credit card. The program determines the vendor and database most appropriate to the user's search. EASYNET then translates the search question into the format required by the database.

"Online Bibliographic Searching and Student Use of Information: An Innovative Teaching Approach," SCHOOL LIBRARY MEDIA QUARTERLY, Lucy Anne Wozny, Fall 1982, pp. 35-42.

Ninth grade honors students in science received training in online bibliographic searching as well as traditional methods of searching the literature. The teachers and librarians cooperated to make the students aware of as

wide a range of information as possible. Students' use of materials from their searches and their awareness of online databases were evidence of the success of the project.

"Online Bibliographic Searching in Secondary School Resource Centres, EMERGENCY LIBRARIAN, William McKinnie, January/February 1983, pp. 8-11.

Use of DIALOG with senior students and staff at the Guelph Collegiate and Vocational Institute (Ontario). Searches were conducted only when standard reference sources had been searched or when the information requested was very specialized. Searches within the first seven months were 69% for staff and 31% for students.

"Online Bibliographic Searching in the Learning Resources Center." CMLEA JOURNAL, Robert Wagers, Spring 1984, pp. 18-22.

Robert Wagers makes a strong argument in favor of providing students with access to online databases. His literature search indicates that very little has been published and that those few schools making use of online reference are doing so on a very limited and experimental basis.

Wagers suggests several relevant databases. He also offers suggestions for involving faculty in the project, probably essential to its acceptance and effective use in the school. Finally, he outlines seven guidelines that would help to assure a successful implementation of such service.

"On-Line Database Services," JR, May 1984, pp. 101-107.

Popular treatment of the subject with brief descriptions of the better known database services.

"The Online Searcher: Education and Training," LIBRARY HIGH TECH, Carol Tschudi, Summer 1983, pp. 85-87.

The author makes a strong case for the need to train online searchers "offline" in an environment where they can play with the searches, become comfortable with searching, and avoid making mistakes at search costs of $150 to $200 per hour. The suggested approach is the development of appropriate training tools on a microcomputer. Such a program would simulate online browsing, manipulation of search strategies, and recovery from mistakes. No plans for development are mentioned; it seems to be only a hopeful recommendation.

"Online Searches for Kids," LIBRARY JOURNAL, Tina Roose, November 1, 1984, pp. 2010-2011.

The ongoing debate on whether we should provide information for students or teach them how to find information for themselves is especially relevant when we plan to use online information. Public library database searches can be very valuable to high school students, and the author argues that the students have as much right to this service as adults.

"Online Searching and the School Media Program," SCHOOL LIBRARY MEDIA ANNUAL 1984, VOLUME TWO, Karen Dowing, Chapter 32, pp. 425-435.

Students can be introduced to online information databases in the school media center and this instruction can be integrated into the high school library skills program. The students who had this opportunity found it both enjoyable and rewarding. The actual searching is done by the media specialist or trained student assistants. Several examples of searches provided for students are included. There are also practical suggestions for implementing the system.

"Online Searching: How to Get Instant Information," ELECTRONIC LEARNING, Diane E. Butcher, November/December 1984, pp. 39-40, 90.

Very simple question-and-answer introduction to online searching that would be useful to present the concept to teachers, administrators, or others unfamiliar with online information databases.

"Online Searching in Perspective; Advantages and Limitations," CATHOLIC LIBRARY WORLD, Jane I. Thesing, February 1983, pp. 258-260.

Online searching is especially useful with complex multi-topic questions, when the user wants to limit the search in specific ways, to provide access points not available in print sources, for information not included in print sources or too current to have been published. Limitations include the lack of quality indicators for citations, restricted subject content of many databases, delivery of bibliographic citations rather than facts, many citations that will not be available locally, and the frequent lack of retrospective coverage.

"Online Searching: Keys to Success," LIBRARY JOURNAL, Tina Roose, May 15, 1984, pp. 958-959.

Successful introduction of online searching in a public library requires the cooperation of the staff, administration, and board. The issue of fees vs. quality of service is also discussed.

"Online Searching: Selected Periodicals," EDUCATION LIBRARIES, Carla A. Hendrix, Spring 1984, pp. 11-12.

Brief descriptions and addresses for DATABASE, ONLINE, and ONLINE REVIEW: identifies online searching columns in LIBRARY JOURNAL and RQ; gives addresses of periodicals from database vendors and publishers.

"Online Searching Styles: An Exploratory Study," COLLEGE & RESEARCH LIBRARIES, Stephen P. Harter, July 1984, pp. 249-258.

Experience appears to be positively related to a flexible, trial-and-error approach to online searching, but there are wide individual differences among online searchers in attitudes as well as behaviors.

"Online Searching: The Future is Now with Knowledge Index," EDUCATIONAL COMPUTER MAGAZINE, Joe Ward, May/June 1983, pp. 28-29.

Brief guide to searching Knowledge Index.

"Online Searching with a Microcomputer -- Getting Started," ONLINE, Susan Casbon, November 1983, pp. 42-46.

Outline of the advantages and disadvantages of online searching, the legal implications, future trends, and factors to consider in selecting hardware and software.

"Online Services at the Reference Desk: DIALOG, RLIN and OCLC," ONLINE, Judith B. Droessler, November 1983, pp. 79-86.

Reports on an emerging trend toward integrating computerized online reference services with traditional reference services in public libraries. This is in contrast to earlier reports that many libraries placed the online reference service in an office area away from the reference desk and frequently funded the service from a separate budget. This trend is accompanied by a reported increase in the proportion of library patrons who use the online reference service.

The study summarized in this article was conducted at the reference desk of the library at Texas A & M University. The equipment needed to access all three online databases was available for use in answering reference questions. The data was gathered during a three month period in the spring of 1982. Searching was conducted by the library staff rather than by patrons.

Restricted funds were available for the project, so online searches were limited to:

(1) Questions that could be answered with the type of information available in the database to be searched,

(2) Questions that could not readily be answered with print resources, and

(3) Questions that could be answered with a search lasting only a few minutes.

The reference librarians decided whether or not to conduct a search. Patrons could also request (and pay for) more extended searches from the regular search service of the university.

An Online Reference Desk Search Report form, completed for each search, is included with the article. Results are tabulated for the 163 searches conducted during the three month test period. DIALOG was searched 67 times at costs ranging from $0.93 to $30.52, with an average cost of $7.40 per search. Undergraduates requested 42% of the DIALOG searches, graduate students 24%, and faculty only 13%; other searches were conducted for library staff and other patrons. Only 63% of the DIALOG searches were effective in producing the requested information or material.

The author concludes that online searching can be a quick and effective tool for answering short reference questions that cannot be answered with the available print materials. The second finding describes the repeated training and practice sessions necessary to help the librarians to become comfortable and skilled searchers; some of the librarians remained very reluctant to learn online search techniques and did not develop these skills.

"A Review of Databases for Education," EDUCATION LIBRARIES, Anne M. Johnsen, Spring 1984, pp. 5-9.

Brief descriptions of 17 databases on DIALOG and/or BRS that are especially useful for educators.

"Searching for Current Information Online...How High School Library Media Centers in Montgomery County, Maryland are Solving an Information Problem by Using DIALOG," ONLINE, Ellen Pruitt and Karen Dowling, March 1985, pp. 47-60.

Detailed description of the introduction of online searching into 22 senior high schools: goals; charts and graphs of actual database use; sample searches; integration of searching into the curriculum; and implications for the future.

"Searching for Online Information: A Primer," LINK-UP, Ardis Anderman, January 1985, pp. 24-25.

Tips for novice searchers, with an emphasis on the need to be well-trained in planning efficient search strategies.

"Shift to Online Ready-Reference Means Big Changes for Libraries," AMERICAN LIBRARIES, July/August 1984, pp. 518-519.

Brief overview of presentation by Elizabeth Titus and Eileen Hitchingham at ALA. Ready-reference database searching differs from fee-for-service searching: there is no charge, search strategies use simple phrases, searching is impromptu and unstructured, and the product is limited. Other presentations on the topic are summarized.

"Student Searchers: Are They Out There?" INFORMATION TODAY, Bev Smith, March 1984, pp. 1-2, 32-33.

Brief reports on programs at Princeton (NJ) High School, Radnor (PA) High School, Bellarmine College Preparatory High School, San Jose (CA), St. Thomas Aquinas High School (Ft. Lauderdale, FL), Lexington School for the Deaf (Jackson Heights, NY), and the statewide efforts of the Pennsylvania Department of Education.

"Teachers Reach Out and Touch with PCs," PC MAGAZINE, Randy Elliot Bennett, November 13, 1984, pp. 335-337.

Use of The Source by students and teachers involved in the IBM/Educational Testing Service Secondary School Computer Education Program.

"Telereference Services: Another Viewpoint," LIBRARY JOURNAL, John Rothman, April 15, 1984, pp. 789-790.

Discusses the difficulties and limitations of providing online reference services to adults and students in public libraries.

"Touring an Informational Wonderland," CLASSROOM COMPUTER LEARNING, William Martin, February 1984, pp. 52, 57-58, 60.

Sample student searches on CompuServe: using the encyclopedia; a search on gardening; daily news; and using the database to connect with individuals and groups sharing common interests.

"Using an Information Retrieval System in a Junior High School," THE COMPUTING TEACHER, Connie Nerby and Bob Hilgenfield, September 1981, pp. 53-54.

Use of The Source in a Contemporary Topics class.

"Using CompuServe to Write Research Papers," PRINTOUT (Indiana Clearinghouse for Computer Education), Susan Eastman and Terry Daugherty, November 1984, pp. 5-6.

Students in an Indiana middle school used library print materials, worked in the science lab, and had online access to the Academic American Encyclopedia, Popular Science, and news sources on CompuServe, doing the searching themselves and then writing their research papers. One control group wrote similar papers using only printed library materials and another group used library materials plus the science laboratory.

"Using DIALOG for Ready Reference," LIBRARY JOURNAL, Katherine A. Golomb and Sydelle S. Reisman, April 25, 1984, pp. 786-788.

DIALOG was treated as an extension of reference service and patrons were not charged for the first 15 minutes of any search. To date the results have been positive. The site is a public library and no mention is made of student use.

"When Your Patrons Want to Search -- The Library as Advisor to Endusers... A Compendium of Advice and Tips," ONLINE, Janne A. Hunter, May 1984, pp. 36-41.

What responsibility does the library have to provide background information, training, hardware and software, continuing assistance, online fees, search printouts, and other services to users who want to do their own searching?

"Who are the Consumers? What are the Questions?" LIBRARY JOURNAL, Tina Roose, February 1, 1984, pp. 154-155.

The focus is on the public library, with no indication of student use.

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Redwood City, California

APPENDIX A

SAMPLE BUDGET PROPOSAL AND RATIONALE

This budget proposal assumes that the librarian has a microcomputer available in the library, a disk drive, a printer, and a telephone line. It is a basic budget for initiating online service to a school library for the teaching of online skills. For continuing service after the first year, only budget items in Parts II and III need to be considered. If a library decides to offer online search services to students, faculty, and administrators, additional budget amounts for connect time, telecommunications charges, citation charges, and offline printing charges will be needed. All costs in this sample budget are estimated averages.

| | | |
|---|---|---|
| I. | Equipment | |
| | Serial interface | $ 100 |
| | Modem | 150 |
| | Communications software | 150 |
| | Cables, connectors as needed | 75 |
| II. | Connect time | |
| | Classroom instruction - 200 students, 1/2 hour each @ $15/hr. | 1,500 |
| | Demonstration and teacher preparation 10 hours @ $15/hr. | 150 |
| III. | Supplies and documentation | |
| | Ribbons, paper, discs, manuals, thesauri | 100 |
| | TOTAL | $2,225 |

NOTE: Classroom instruction rates normally include telecommunications charges, citation charges, and applicable royalty fees. Long distance telephone charges incurred to reach a node are extra.

When making a presentation to administrators for funds to include online searching in the library media curriculum, librarians need to have a clearly defined rationale prepared.

Dr. Jacqueline C. Mancall, in her article "Training Students to Search Online: Rationale, Process, and Implications," which appeared in the Drexel Library Quarterly, Winter 1984, p. 64. states:

> "Today's students live in an information-rich society, one in which information has become the essential ingredient for decision-making. In order to be successful, students have to know how to locate the data they need regardless of the format in which it has been stored. This is not a revolutionary idea. Educators have always acknowledged the importance of providing students with the skills they need

to locate information, and school curricula have traditionally incorporated instruction in this broad area under the rubric of library skills.

The rationale for providing training in how to locate information has been that students cannot be competent locators of the information they need without understanding what materials are available to them and how these materials are organized for retrieval. In order to accomplish this, students learn early in their school experience which books, magazines, and other media are available in libraries and how they are arranged. They are introduced to such conventional library tools as the card catalog and how to use it by searching under author, title, and subject. Instruction is also offered to students in the use of popular indexing tools, such as the Reader's Guide to Periodical Literature which can be used to locate pertinent magazine articles."

APPENDIX B

SAMPLE

Student Search Record

SEARCH #_____

DATE _____

STUDENT NAME _____

SEARCH TITLE _____

NUMBER OF SESSIONS _____

| | Time | Cost |
|---|---|---|
| DATABASE USED: _____ | | |
| DATABASE USED: _____ | | |
| DATABASE USED: _____ | | |
| TOTAL | | |

APPENDIX C

SAMPLE SEARCH

ERIC 1966 - AUG 1985 (BOTH)
BRS SEARCH MODE - ENTER QUERY

1: (garbage or trash or rubbish) and (fuel$1 or energy or power)

RESULT 18 DOCUMENTS

2: ..Limit/1 yr > 79

RESULT 7 DOCUMENTS

BRS SEARCH MODE - ENTER QUERY

3: ..Print 2 bibl/doc=1-7

AN EJ293990.
AU Chandler, William U.
TI Converting Garbage to Gold: Recycling Our Materials.
SO Futurist; v18 n1 p69-77 Feb 1984. 84.
YR 84.
AB Recycling conserves energy, fights pollution and inflation, creates jobs, and improves the outlook for the future of materials. But converting a throwaway society to recycling will depend on finding good markets for waste paper and scrap metals. (RM).

AN ED238723.
AU Chandler, William U.
TI Materials Recycling: The Virtue of Necessity. Worldwatch Paper 56.
PR EDRS Price - MF01 Plus Postage. PC Not Available from EDRS.
NT 57p.
YR 83.
AB This report focuses on the necessity and advantages of recycling. Following an introduction, the report is divided into five sections, addressing respectively: the necessity of recycling; waste paper recycling; aluminum recycling; iron and steel recycling; and three steps to a "recycling society." These steps include: (1) requiring that consumers pay full costs of materials they use and requiring efforts to reduce energy price subsidies; (2) building world markets for scrap paper, aluminum, and iron/steel; and (3) efforts to insure greater collection of wastes. Incentives, information, or the threat of fines and non-collection of garbage are suggested as ways to implement the latter step, one which would also reduce environmental subsidies, promote international scrap trade, and soften the impact of higher energy prices. Potential for recycling, recycling trends, and special technical and political circumstances are among the topics discussed in the sections on the recycling of waste paper, aluminum, and iron/steel. (JN).

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APPENDIX D

LIST OF VENDORS

BRS (Bibliographic Retrieval Services) Information Technologies
1200 Route 7
Latham, NY 12110
(800) 345-4277

BRS has over 90 different databases or files available to its users. Users can either subscribe on a contract basis or pay an initial fee plus hourly database connect charges. Classroom instruction rates are available. Off-hours searching is available at reduced rates through "BRS After Dark."

CompuServe
500 Arlington Center Boulevard
P.O. Box 20212
Columbus, OH 43220
(800) 848-8990

CompuServe began in 1972 and is a subsidiary of H and R Block Inc. It was started as a data processing "time-sharing" service and in 1979 access to their computer was made available to computer hobbyists. This allowed hobbyists to use the computer's idle capacity during nonbusiness hours. They provided the hobbyist with 128 K of storage which provided the early home computer enthusiasts with access to programming in the various main frame computer languages using early inexpensive computers. CompuServe has now grown to provide electronic mail, magazine articles, weather information, air craft flight planning, a form of electronic CB communication, commodity and stock information, special interest bulletin board, ability to download software, home banking, electronic shopping, college selection, on-line World Book Encyclopedia reference, and games.

DIALOG Information Services, Inc.
3460 Hillview Avenue
Palo Alto, CA 94304
(800) 227 1927

Beginning in 1972, DIALOG now has over 220 different databases available to its users. No initial fee is required. Users pay per database connect hour used plus telecommunications charges. Classroom instruction rates are available.

Dow Jones News/Retrieval Service
P.O. Box 300
Princeton, NJ 08540
(800) 257-5114

The Dow Jones News/Retrieval Service (DJNS) was started in 1974 as a service to stock brokerage houses and professional investors. The service began to expand in 1980 to meet the needs of the whole family while maintaining an emphasis on in-depth financial assistance. All subscribers can secure stock quotations with only a 15 minute delay from hour activity. Other features include UPI world report, Wall Street Journal highlights, weather reports, electronic shopping, movie reviews, in-depth financial information both current and historical, text search (by key words of articles from Barron's, Wall Street Journal and Dow Jones News Service), on-line encyclopedia searching, etc.

SOURCE Telecomputing Corp.
1616 Anderson Road
McLean, VA 22102
(800) 336-3330

The SOURCE began in 1979 and was purchased by Reader's Digest in 1981. The SOURCE offers over 1200 features and programs that are of general interest and marketed to a broadbase of the public. Some of the features are electronic mail, UPI news, abstracts from magazines, stock and commodity averages, programming, games, electronic shopping, travel schedules and tickets, movie reviews, electronic typesetting, etc.

Wilson Line
H. W. Wilson, Inc.
Bronx, NY
(800) 367-6770

Beginning in 1983, the H. W. Wilson Company began making its indexes, including the Reader's Guide to Periodical Literature, available to online users. Subscribers must contract on a yearly basis for projected use. Rates vary by amount of use and whether the user subscribes to the print equivalent. Classroom instruction rates are available.

APPENDIX E

TELECOMMUNICATIONS NETWORKS

CUSTOMER SERVICE NUMBERS & ADDRESSES

DATAPAC 1-613-567-8798

Room 18-90
160 Elgin
Ottawa, Ontario K163J4

TELENET 1-800-336-0437

12490 Sunrise Valley Drive
Reston, VA 22096

TYMNET 1-800-336-0149

2070 Chainbridge Road
Vienna, VA 22180

UNINET 1-800-821-5340

2525 Washington
Kansas City, MO 64108

APPENDIX F

COMMONLY USED DATABASES

Agricola. Database from the National Agricultural Library, includes periodicals and books on agriculture and related subjects. 1970 to date.

Biography Master Index. Database from Gale Research Company which indexes biographical information from several hundred different directories and handbooks.

Biosis Previews. Database indexes journals, books, and reports in the biological sciences, including Biological Abstracts. 1969 to date.

Books in Print. Current listing of books published or distributed in the United States. Corresponds to the print version of Books in Print published by R. R. Bowker Company.

Congressional Record Abstracts. Database contains abstracts based on issues of the Congressional Record. Includes data on current bills, members of Congress, speeches, etc.

DOE Energy. Database of the Department of Energy. Indexes journals, reports, and books about energy and energy-related topics. 1974 to date.

Encyclopedia of Associations. Database from Gale Research which provides information about all types of trade and professional associations currently in the United States.

Enviroline. Database indexes journals, books, documents, and newspaper articles related to environmental information. 1971 to date.

ERIC. Database of the Educational Resources Information Center which includes abstracts of research reports and projects as well as citations from educational journals. Corresponds to the print versions of RIE and CIJE. 1966 to date.

LC Marc. Complete bibliographic records of all books in the Library of Congress since 1968. Can be searched by author, title, subject and series.

Magazine Index. Broad coverage of popular magazines including current affairs, the performing arts, business, sports, recreation and travel, consumer product evaluations, science and technology, leisure time activities, and other areas. 1959 - March 1970, 1973-present, monthly updates.

Medicine. Covers all aspects of biomedicine, including the allied health fields, biological and physical sciences, humanities and information science as they relate to medicine and health care. Indexes articles from over 3,000 international journals published in the United States and 70 countries. 1966-present, monthly updates.

Microcomputer Index. Subject and abstract guide to magazine articles about the microcomputer world, book reviews, software reviews, discussions of applications in various disciplines, descriptions of new microcomputer products, and more. 1981 - present, quarterly updates.

National Newspaper Index. Provides indexing of articles and other items from the "Christian Science Monitor," the "New York Times," the "Wall Street Journal," the "Washington Post," and the "Los Angeles Times." 1979 - present (1982 - present for the "Los Angeles Times" and the "Washington Post"), monthly updates.

A-V Online (formerly NICEM). Offers coverage of nonprint educational material - 16mm films, 35mm filmstrips, overhead transparencies, audiotapes, videotapes, phonograph records, motion picture cartridges, and slides. Current, irregular updates.

NTIS. Consists of government-sponsored research, development and engineering, plus analyses prepared by federal agencies and their contractors or grantees. Also, includes material on technological applications, business procedures, and regulatory matters. 1964 - present, biweekly updates.

PAIS. Sources include periodical articles, government documents, books, pamphlets, reports, yearbooks, and directories to information in all fields of social science, economics, business, political science, government, law, and banking. 1972 - present, monthly updates.

Peterson's College Database. Lists and describes colleges and universities with two- and four-year degree programs from the U.S., the U.S. territories of Guam and the Virgin Islands, and Canada. Current, annual updates.

PsycInfo (formerly Psychological Abstracts). Covers the literature in psychology and related disciplines in the behavioral sciences. Journal articles, technical reports, dissertations, conference reports and other monographs are included. 1967 - present, monthly updates.

SCISEARCH. Index to the literature of science and technology prepared by the Institute for Scientific Information. Includes articles, reports of meetings, letters, editorials, correction notices, etc. from major scientific and technical journals. 1974 - present, biweekly updates.

Social SCISEARCH. Indexes significant items from important social science journals and social science articles in the natural, physical and biomedical sciences. 1972 - present, monthly updates.

APPENDIX G

GLOSSARY

Access Point - A data element (part of a record) used to retrieve a particular file or record. For example, a keyword assigned to a record by an indexer is one access point, among several others, to that record in the file.

Accession Number - A number assigned to each item or record in a database. In databases which are byproducts of printed services (e.g., abstracts from journals), the accession number is usually equivalent to or derived from the number assigned to the item by the publisher.

Acoustic Coupler - A data communications device which converts audible tones into digital signals and vice versa. It attaches to an ordinary telephone handset and serves as the interface between the terminal and the communications network.

ASCII - Abbreviation for American Standard Code for Information Interchange. The code has seven data bits and one parity bit. It is widely used in data processing systems, communication systems, and associated equipment.

Baud - A measure of signalling rate equal to the number of signal elements transmitted each second. In most cases, the number of characters which a terminal can type or display in one second is roughly one-tenth the baud rate; i.e., a 300-baud terminal is capable of 30 characters/second.

Bibliographic Database - A database in which the records contain information about a document (title, author, subject headings, source) rather than the document itself. A bibliographic record is sometimes called a "document surrogate," especially if it contains an abstract.

Boolean Logic - A method of logic developed by George Boole, an English mathematician, which uses the logical operators - AND, OR, and NOT - to show relationships between sets or terms. Most online systems (but not all) allow the searcher the use of Boolean logic in developing search strategies.

Cathode Ray Tube (CRT) - A video display device, similar to a TV screen, which is used to display computer output. A CRT terminal usually consists of a cathode ray tube for data display, a keyboard for data entry, and a modem for data communications.

Citation - References in a publication which refer the reader to another source.

Command Language - The set of instructions used by the searcher to communicate with the computer in a particular search system.

CRT - See Cathode Ray Tube.

Communications Network - The concrete entity by which a group of nodes interconnect for the transmission of data.

Computer-Readable - See Machine-Readable.

Connect Time - The amount of time the remote terminal is connected to the host computer. This measure is usually one of the prime components in the costs associated with online searching.

Data Element - A category of information within a record. For example, the title of an article is a standard data element in a bibliographic record.

Database - A collection of data in machine-readable form. The term "file" is generally used interchangeably with "database."

Database Producer - The organization which collects or generates information and produces it in some machine-readable form. Many database producers also publish a print product equivalent to or derived from the machine-readable file.

Descriptor - A term (one or more words) which is assigned to describe the content of an item in a database. Although often used interchangeably with "identifier," "descriptor" has come to mean a term chosen from a controlled vocabulary list or thesaurus, whereas "identifier" is a "free-language" term; i.e., it is assigned by the indexer but not chosen from a controlled vocabulary list.

Downloading - The process of copying part or all of a database stored in one computer into another computer via online telecommunications. In the context of online searching, a search is performed and the results "downloaded" and stored in the searcher's own computer, generally a microcomputer.

Duplex - See full duplex and half duplex.

End User - The individual who ultimately uses the information retrieved in a search. This person may or may not be the terminal operator.

Field - A set of characters in a database treated as a unit which denotes a particular kind of data (e.g., author field, title field). This term is often used interchangeably with "data element."

File - A database. A collection of related records. Some computer specialists refer to a database as a group of files, but in the online field these terms have become virtually synonymous.

Free-Text Searching - Searching without the use of a thesaurus or controlled vocabulary. Words in an abstract, for example, are often searchable in an online system, but successful retrieval of an item using free-text searching of the abstract depends on (a) the presence of the term in the abstract and (b) the thoughtfulness of the searcher in choosing that term for searching.

Full-Duplex - A data communications term which means that a device is capable of transmitting and receiving data at the same time.

Full-Text Searching - See Free-Text Searching.

Half-Duplex - A data communications term which means that a device is capable only of either transmitting or of receiving data at a given time. Note: many computer terminals have a switch which can be set in either full-duplex or half-duplex mode, depending on the requirements of the retrieval system.

Hits - See Postings.

Host Computer - Online vendor's computer to which terminals are connected through the communications network.

Interactive System - An online system which allows the user to input instructions, receive a response, and then modify or manipulate the retrieved results. All online database systems today are considered to be interactive systems. They are also referred to as conversational systems.

Intermediary - A specialist who performs searches on behalf of the actual user (often called the end user) of the information thereby retrieved.

Items - See Postings.

Keyboarding - A process by which information is transcribed into computer-readable form, usually through a typewriter-like console.

Logical Operators - See Boolean Logic.

Logging Off- The procedure used to end a search session.

Logging On - The procedure used to begin a search session.

Machine-Readable - Information recorded in a form which the computer or other electronic device can read and process.

Microcomputer - A complete computing system which utilizes a microprocessor as its central processing unit and which also includes memory, circuitry for input and output and other functions, a power supply, and a keyboard or control panel.

Microprocessor - A central processing unit using LSI technology (large-scale integration). Often referred to as a "computer on a chip."

Modem - The acronym for modulator-demodulator. A modem is used to connect computers and terminals. It is often used interchangeably with "acoustic coupler," but technically speaking, a modem may or may not use the handset of the actual telephone to transmit signals as does an acoustic coupler, which is actually just one form of modem.

Network - See Telecommunications Network.

Network Node - A terminal or computer with communications capabilities in a computer network.

Node - See Network Node.

Non-Bibliographic Database - A collection of data which is numeric, full-text, or directorial in nature rather than bibliographic.

Numeric Database - A database primarily consisting of numbers and other related data of a factual nature.

Offline - Computer processing which takes place after the searcher has logged off and is no longer interacting with the computer. Can refer to citations and/or abstracts which are printed and sent through the mail rather than printed on the terminal. It can also refer to a part of a database which is only accessible by batch processing - i.e., is not part of the online file.

Online - The state of being in direct, immediate communication with the computer. (See also: Interactive)

Online Searching - Searching wherein the search is processed while the user is connected to the computer, thereby allowing the user to interact with the computer and adapt the search according to the computer's responses.

Online Service - See Vendor.

Online System - See Interactive System.

Password - A unique identification code, usually a set of letters and numbers, which gives individual users access to the online system and which the online vendors use to charge their users.

Patron - See End User.

Port - A single channel of the vendor's data processing system which accepts data from a user through the network and passes it into and out of the host computer; one entry point in the communications interface.

Postings - In practice, the term "postings, hits, and items" are used almost interchangeably to mean the group of unique records in a given set of search results. The words have different shades of meanings, however, and it may be useful to distinguish among them as follows:

Postings - Relevant items are "posted" (or listed) under the appropriate access points in a database. One item may be posted to many different access points. Thus, for example, an item dealing with microcomputer applications in libraries could be posted under the term "microcomputers" as well as under the term "libraries." All the records listed under a particular term are called the term's postings.

Hits - Whenever a search locates desired records - that is, the computer finds matches between the search statement and the terms in a database - the output results are often called "hits." If a single search term was used (for example, our term "microcomputers"), then the number of hits equals the number of postings under that term. However, if "microcomputers" and "libraries" are combined in the search statement, the output results (hits) are the records which

have been posted to both of these terms. If used precisely, therefore, the word "postings" alone would not be appropriate to describe the results of this search.

Items - Items are simply complete records in a database. In a bibliographic database, for example, an item might consist of bibliographic information (author, title, date, etc.), keywords assigned by an indexer, and an abstract. In the early days of database searching, computer professionals objected to using the term "records" to describe this sort of complete entity because a record to a computer person, especially one who was used to dealing with keypunch cards, might be only a part of an item (e.g., the author record, the title record, and so forth). By the same token, library professionals objected to using the items references and citations because of the specific connotation surrounding both of these terms. Thus, the term "item" was adopted and since then has been applied to both the complete records as they exist in a database as well as the results of a search.

Printout - The paper product which is produced by the terminal or other output device. It is the record of the search.

Query - See Search.

Random Access - A term used in computer storage systems which means a method of retrieval, used in virtually all online systems, wherein the time required to access a piece of information is independent of its physical location on the storage medium. Previous to random access technology, a database would be searched in a sequential fashion (i.e., each item in a file would have to be examined in order and in turn).

Record - A unit of related information in a database. In a bibliographic database a record is generally meant to mean all of the information stored for one document (e.g., a journal article or a book).

Reference - The information (e.g., author, title, journal title, page) which identifies a source document.

Response Time - The amount of time it takes the computer to respond to the user's query.

Search - The act of requesting the computer to respond to a specific information need.

Search Analyst - See Searcher.

Search Key - See Access Point.

Search Service - See Vendor.

Search Strategy - A plan of action for accessing a database and retrieving the desired items. A search strategy may include a selection of terms, statements as to their desired relationships, and instructions concerning the sequence with which they are to be searched by the computer.

Search System - The computer programs (software) through which a searcher can access a database. For example, SDC's search system is called ORBIT, while Lockheed's is called DIALOG.

Searchable Element - See Access Point.

Searcher - The individual who analyzes the reference question, formulates the search strategy, and operates the terminal. This person may or may not be the ultimate user of the search results.

Set - The group of records which is retrieved at any one step in the search process. (See also: Postings)

Software - The set of programs, procedures, and languages used in a computer system. The term often connotes the availability of the programs for purchase or lease.

Source Documents - The journal articles, monographs, or other original or "primary" material which is indexed by or accessed through the database.

Telecommunications Network - The organization (or its facilities) which provides the communication links between the host computer and user terminals. Online services may be accessed by two types of telecommunications networks: the ordinary telephone or telex network on the one hand and data networks dedicated to data communications only on the other.

Terminal - The data communications device which enters data into and receives data from the computer.

Thesaurus - List of controlled vocabulary terms, usually cross-referenced and often showing relationships among terms.

Timesharing Computer - A computer which can simultaneously share its resources among many different users.

Truncation - The ability to specify some portion of a word being searched for rather than the whole word itself. For example, it may be beneficial to truncate the word "microcomputer" into "microcomput" in order to retrieve items with the terms "microcomputers" and "microcomputing" as well as the original, singular term.

Unit Record - See Record.

Update - The material most recently added to a database. Also, the process of adding material to a database; e.g., the database is updated monthly.

Uploading - The process of transmitting a file stored locally (usually on a microcomputer) to a remote computer (usually a large mainframe). In the context of information storage and retrieval, this usually means a private database is created on an in-house computer and then is transmitted via telecommunications to an online vendor (uploaded) for storage and future retrieval.

User ID - See Password.

Vendor - The organization which provides computerized, online, database searching services. Also known as a "search service."

WATS - Acronym for Wide-Area Telecommunications Service. A service available from the phone company which enables users to make calls for a fixed monthly fee rather than on a call-by-call basis. (Also can refer to "incoming WATS" by which the party called pays for the calls, again on a monthly fee basis.)

Word Frequency List - A list which gives the number of times a word has been used in a particular database.

Fenichel, Carol H. and Hogan, Thomas H.
Online Searching: A Primer. 2nd ed.
Learned Information, 1984

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APPENDIX H

PENNSYLVANIA QUALITY GOALS OF EDUCATION

(1) COMMUNICATION SKILLS. Quality education shall help every student acquire communication skills of understanding, speaking, listening, reading, and writing. Objectives are:

a. Comprehension of oral, written, and nonverbal communication.
b. Composition of oral and written communication.
c. Interpretation of and facility with language patterns.
d. Comprehension and appreciation of literature and arts.
e. Use of information sources and research techniques.

(2) MATHEMATICS. Quality education shall help every student acquire knowledge, appreciation, and skills in mathematics. Objectives are:

a. Knowledge of numeration and computation.
b. Knowledge of geometry and measurement.
c. Knowledge of computer literacy and data management.
d. Development of reasoning, problem-solving, and creativity.
e. Knowledge of mathematical life skills and applications.

(3) SCIENCE AND TECHNOLOGY. Quality education shall help every student acquire the knowledge, understanding, and appreciation of science and technology. Objectives are:

a. Knowledge of basic scientific concepts and processes.
b. Understanding of technological applications of scientific principles.
c. Appreciation of interaction of science, technology, and society.
d. Opportunity for inquiry and hands-on activity in science and technology.
e. Understanding and use of scientific methodology.

(4) CITIZENSHIP. Quality education shall help every student learn the history of the United States, understand its systems of government and economics, and acquire the values and attitudes necessary for responsible citizenship. Objectives are:

a. Knowledge of histories: local, state, national and global.
b. Understanding of systems of government and law.
c. Understanding of systems of economics.
d. Knowledge of individual rights and responsibilities.
e. Knowledge of the participatory nature of the democratic system.

(5) ARTS AND THE HUMANITIES. Quality education shall help every student acquire knowledge, appreciation, and skills in the arts and the humanities. Objectives are:

a. Comprehension of principles and concepts in art, music, craftsmanship, other discrete arts, and the humanities.
b. Understanding of the influence of literature, philosophy, and tradition in shaping our heritage.
c. Development of analytic and performing skills in the arts and the humanities.
d. Application of objective and aesthetic criteria to decision-making.
e. Participation in intellectual and creative experiences in the arts and humanities.

(6) ANALYTICAL THINKING. Quality education shall help every student develop analytical thinking. Objectives are:

a. Development of information management skills.
b. Development of logical thinking skills.
c. Development of problem-solving skills.
d. Development of decision-making skills.

(7) FAMILY LIVING. Quality education shall help every student acquire the knowledge, skills, and attitudes necessary for successful personal and family living. Objectives are:

a. Development of personal and family relationships.
b. Selection, management, and maintenance of personal and family resources.
c. Understanding of economics of family life.
d. Development of consumer skills.

(8) WORK. Quality education shall help every student acquire the knowledge, skills, and attitudes necessary to become a self-supporting member of society. Objectives are:

a. Development of career awareness.
b. Development of personal career planning skills.
c. Development of job seeking, job getting, and job keeping skills.
d. Development of entry level occupational skills.
e. Development of an awareness of the dignity of work.
f. Development of current labor market skills to foster economic development.

(9) HEALTH. Quality education shall help every student acquire knowledge and develop practices necessary to maintain physical and emotional well-being. Objectives are:

a. Development of personal and physical health.
b. Knowledge of community health, disease prevention, and control.

c. Knowledge of human growth, development, and good nutrition.
d. Awareness of the dangers of tobacco, alcohol, and other drugs.
e. Knowledge of safety and first aid skills.
f. Development of family and consumer health.

(10) ENVIRONMENT. Quality education shall help every student acquire the knowledge and attitudes necessary to maintain the quality of life in a balanced environment. Objectives are:

a. Knowledge of natural and human resources.
b. Understanding of geographic environments: local, regional, global.
c. Knowledge of interrelationships and interdependence of natural and human systems.
d. Development of personal environmental attitudes and values.
e. Development of environmental problem-solving and management skills.
f. Knowledge of and appropriate uses of energy.

(11) SELF-ESTEEM. Quality education shall help every student develop self-understanding and a feeling of self-worth. Objectives are:

a. Understanding of personal strengths and limitations.
b. Recognition of one's personal abilities, interests, and accomplishments.
c. Awareness of one's personal beliefs and opinions.
d. Development of self-confidence.
e. Development of personal adaptability to change.

(12) UNDERSTANDING OTHERS. Quality education shall help every student acquire knowledge of different cultures and an appreciation of the equal worth and rights of all people to include the active roles and contributions of women, minority racial, and ethnic groups. Objectives are:

a. Knowledge of cultural similarity and diversity.
b. Knowledge of individual similarity and diversity.
c. Development of interpersonal relationship skills.
d. Understanding of human interdependence.
e. Knowledge of roles and contributions of racial and ethnic groups and women.